

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

## **IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

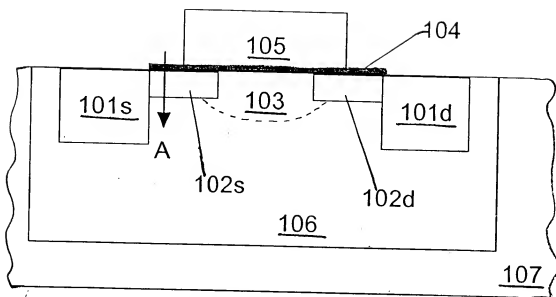
$\lambda$	wavelength
$f$	predetermined frequency
219E	position
A	arrow
$a$	abruptness of the dopant profile
Al	absorption length
Almax	maximum absorption length
Almin	minimum absorption length
B	bottom surface
Bdiameter	diameter of spots
Bprobe	probe beam diameter
Bpump	pump beam diameter
Dscan	beam scanning distance
$dz$	change in profile depth
F	front surface
langle	angle
L	straight line
L1	line
L2	line
$N_d$	peak of the dopant profile
Rlength	length
Rwidth	width
S1	maximum value of signal
S1a	signal
S1b	signal
S2	minimum value of signal
S2a	signal
S2b	signal
Samplitude	signal amplitude
Samplitude1	signal amplitude
Samplitude2	signal amplitude
Samplitude1	signal amplitude
SamplitudeN	signal amplitude
Savg	average signal
Smax	maximum signal
t1	time
t2	time
t3	time
t4	time
tmax	duration of maximum signal
tmin	duration of minimum signal
trise	duration of signal rise
$z_j$	depth of a junction (or other profile)
$z_l$	layer thickness
101d	drain region
101s	source region
102d	drain extension region
102s	source extension region

103	channel region
104	gate insulator
105	gate
106	well
107	semiconductor substrate
112A	profile
112B	profile
201	act
202	act
203	act
204	act
205	act
210	test structure
211	doped region
212	boundary
213	undoped region
214	normal line
215	photodetector
216	well region
217	laser
218	beam splitter
219	beam
219A	spot
219A	position
219B	position
219C	position
219D	position
220	IC portion, active device
230	substrate, wafer
231	interface
232	interface
271A	laser
271B	laser
271C	laser
272	dichroic mirror
274	beam deflector
274	acousto-optic deflector
275	beam
275A	position
275B	position
276	beam splitter
277	photodetector
278	dashed arrow
279	optical bench
279S	planar surface
281	stage
282	mirror
283	objective lens

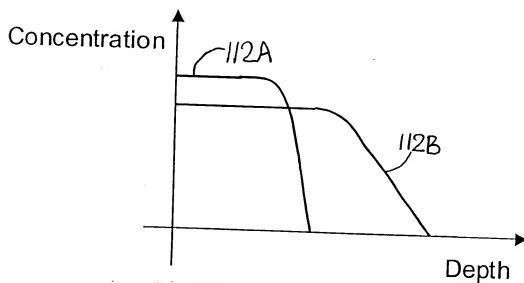
301	doped region
301a	region
302	boundary
302a	boundary
303	undoped region
303a	lightly doped region
303b	shallow doped region
304	interface
304a	planar surface
306	body
307	substrate
308b	photodetector
309a	spot position
309b	spot position
314	incident beam axis
381L	in-between region
381R	doped region
383L	undoped region
383R	in-between region
388a	extreme position
388b	position
388c	position
388d	extreme position
391	dielectric/conductive layer
401	act
402	act
403	act
404	act
405	act
406	act
407	act
410	patterning tool
411	ion implanter
412	mask removal tool
413	measurement tool
414	annealer
415	unit
416	computer
420	bus
421	connection
422	connection
423	connection
430	wafer
511	ion implantation mask
513	ion-implanted region
514a	region
514b	region
602	hole

603	region
604	expanded doped region
606	substrate
611	photoresist layer
612	hole
613	implanted region
614	expanded doped region
701	undoped or low doped region
702	doped layer
703	interface
704	incident beam
705	reflected beam portion
706	reflection component
707	transmitted beam
708	reflection component
709	reflection component
710	transmitted beam portion
801	simplified profile
901A	linear portion
901B	linear portion
901C	linear portion
921	surface
922	surface
923	cross
924	cross
925	cross
926	arrow
927	arrow
928	arrow
929	arrow
933	act
934	act
936	act
937	act
938	act
1001	block
1002	block
1003	block
1004	block
1005	block
1101	doped region
1103	undoped region
1106	well region
1109	probe beam
1109a	position
1109b	position
1110	pump beam
1110a	position

1110b	position
1111	beam
1112	transmitted pump beam
1113	excess carrier distribution
1114	excess carrier distribution
1201	measurement laser
1201a	laser
1201b	laser
1201c	laser
1202	collimating lens
1202a	collimating lens
1202b	collimating lens
1202c	collimating lens
1203	collimated beam
1204	quarter-wave plate
1204a	half-wave plate
1204b	half-wave plate
1204c	half-wave plate
1205	generation laser
1206	collimating lens
1207	collimated beam
1208	half-wave plate
1210	dichroic mirror
1211	incident beam
1212	detection system beam splitter
1213	vision system beam splitter
1214	prism
1215	beam deflector
1216	objective lens
1217	wafer
1218	stage
1219	piezoelectric actuator
1219a	polarized beam
1219a	polarized beam
1219b	polarized beam
1219b	polarized beam
1221	optical filter
1222	beam splitter
1223	detector
1224	detector
1226	lens
1227	camera
1230	transimpedance amplifier
1231	lock-in amplifier
1232	computer
1235	connection
1237	connection



**FIG. 1A**  
(PRIOR ART)



**FIG. 1B**  
(PRIOR ART)

FIG. 2A

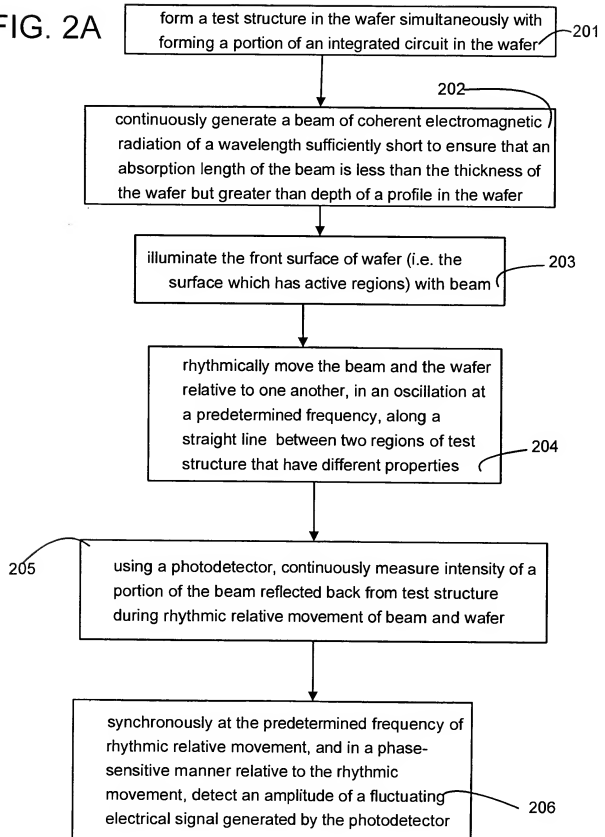






FIG. 2D

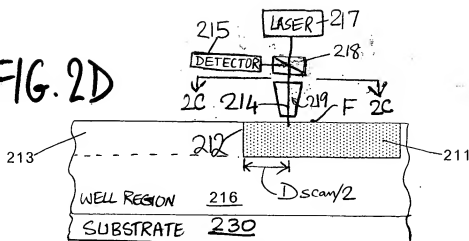


FIG. 2E

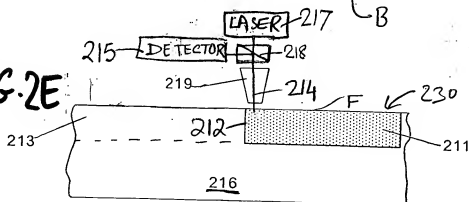


FIG. 2F

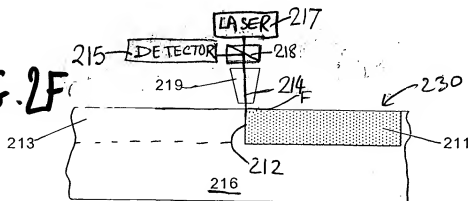
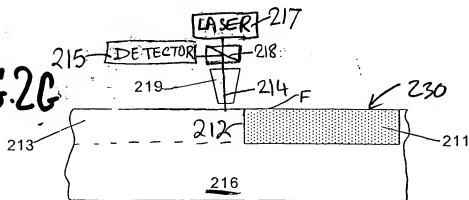
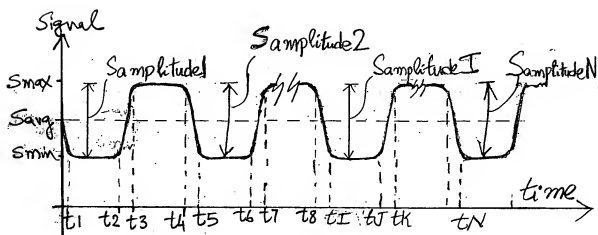
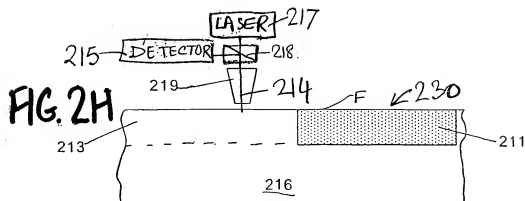


FIG. 2C





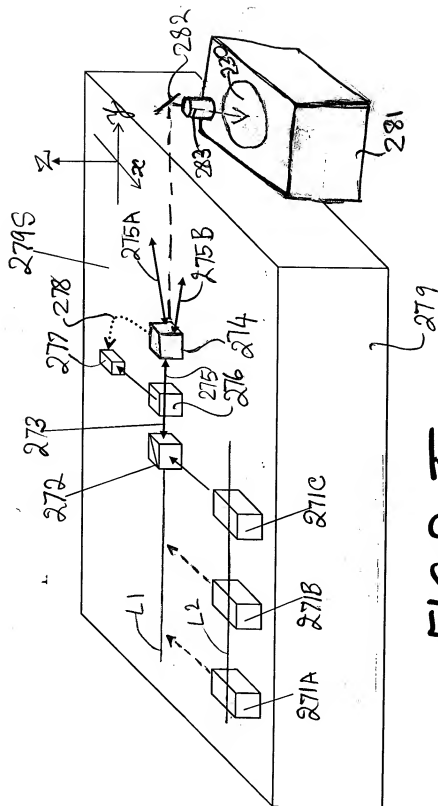
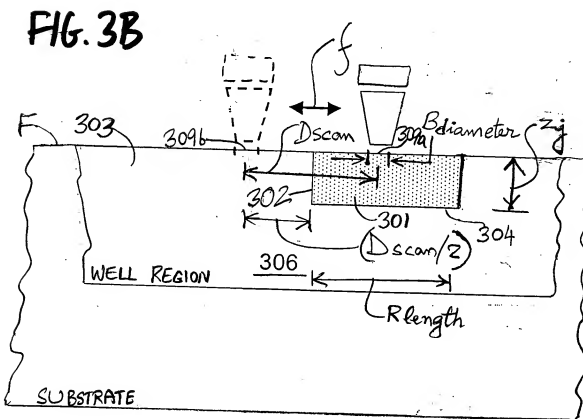
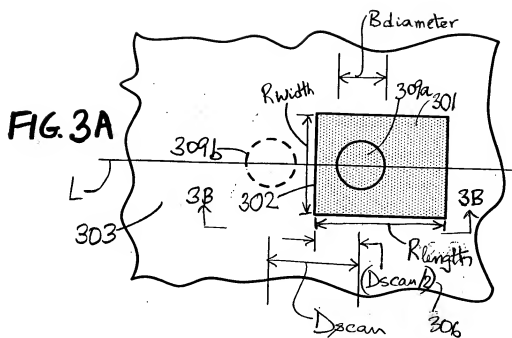
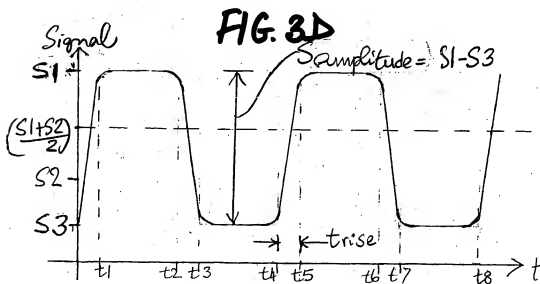
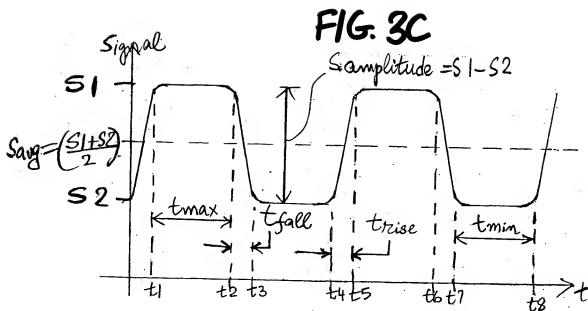
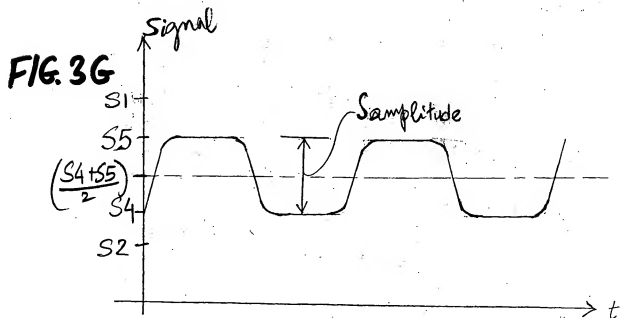
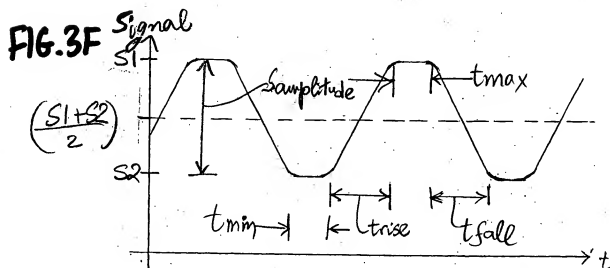
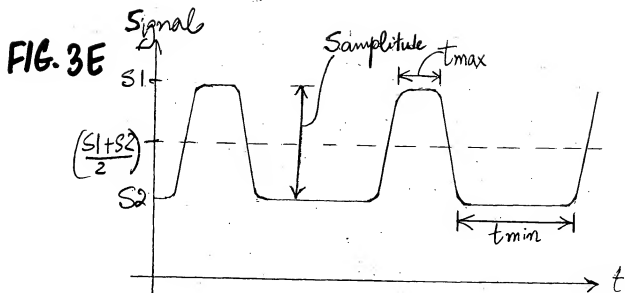
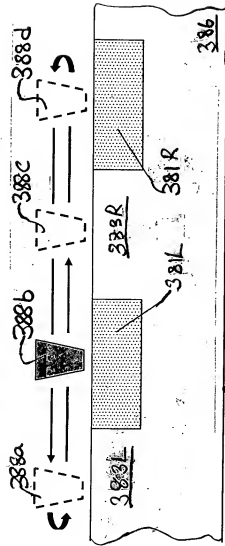


FIG. 25



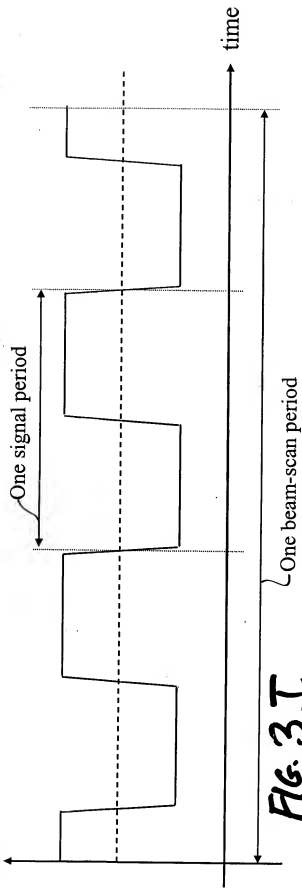






**FIG. 3H**

Signal



**FIG. 3I**



FIG. 3J

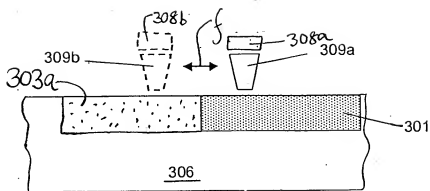


FIG. 3K

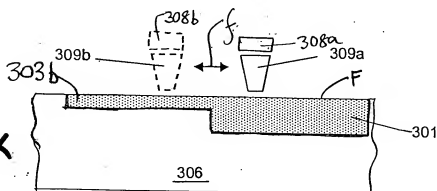
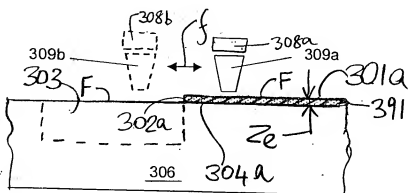
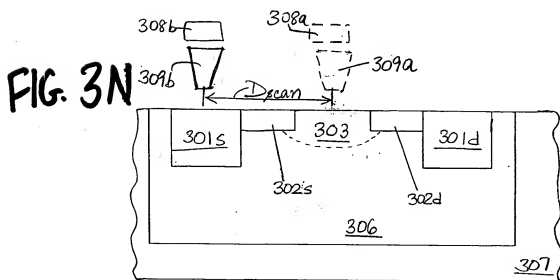
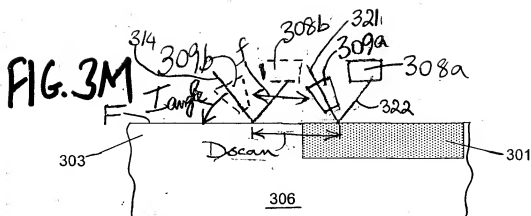
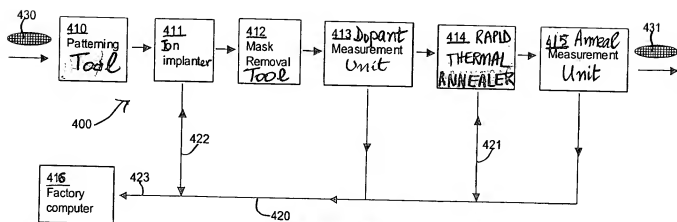
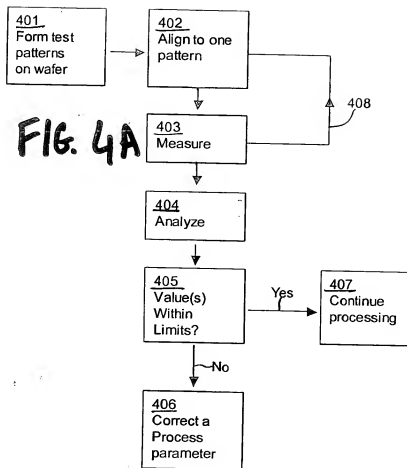
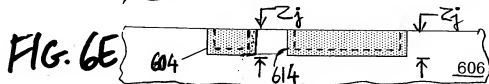
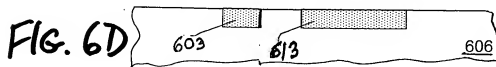
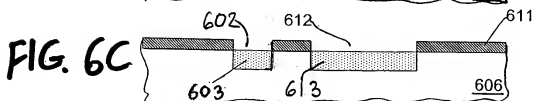
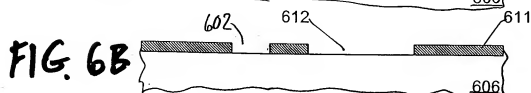
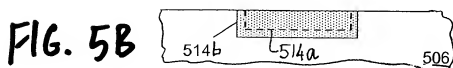
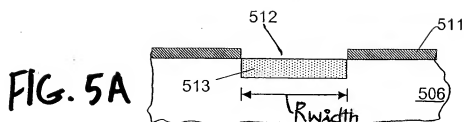


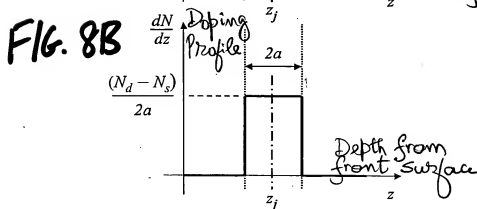
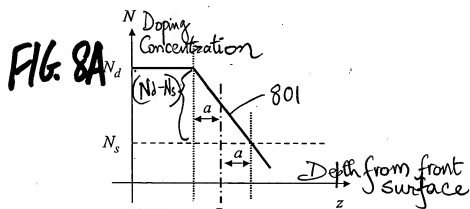
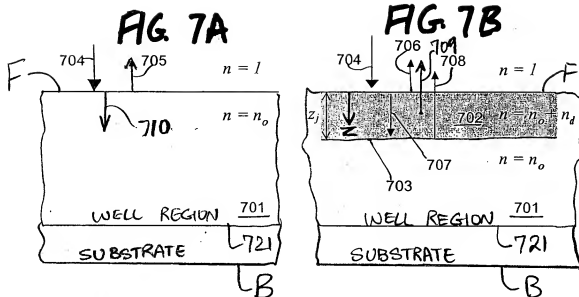
FIG. 3L











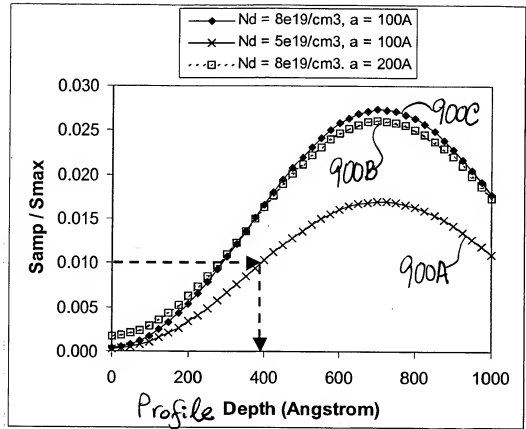
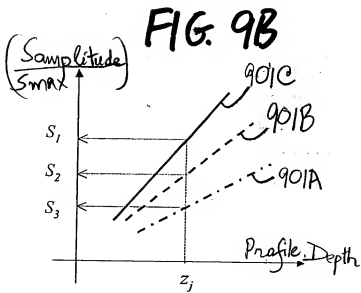
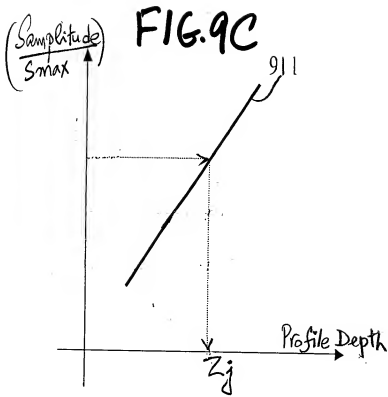


FIG. 9A





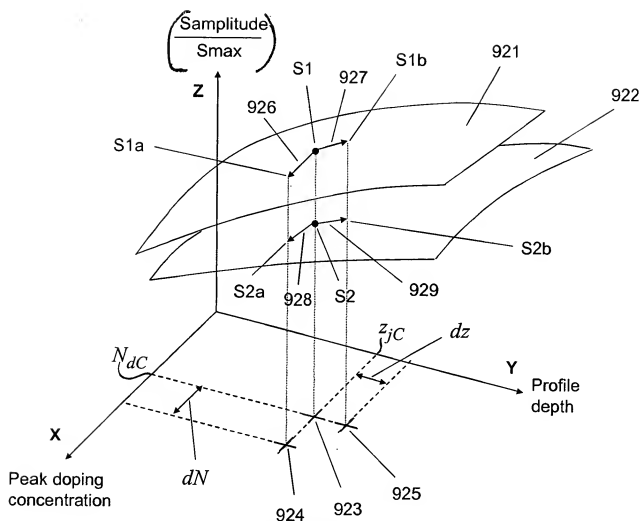


FIG. 9D



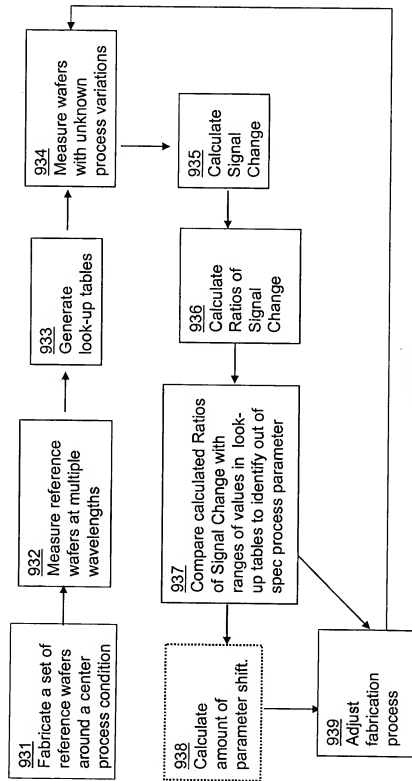


FIG. 9E

FIG. 10A

Mathcad Professional - [Scanning xj solved.mcd]

Normal

$$N_s = 3 \cdot 10^{18} \quad k(\lambda) = 2 \cdot \frac{\pi}{\lambda} \quad \omega(\lambda) = 2 \cdot \pi \cdot \frac{c}{(\lambda \cdot 10^{-8})}$$

$$\beta(\lambda) = \frac{(-q^2 \cdot 10^6)}{2 \left[ \epsilon_0 \sqrt{\epsilon_s \cdot m_0} (\omega(\lambda))^2 \right]} \quad \text{sinc}(a, \lambda) = \frac{\sin(2 \cdot k(\lambda) \cdot n \cdot a)}{2 \cdot k(\lambda) \cdot n \cdot a}$$

$$S(N_d, \lambda, z, a) = \left[ 4 \cdot \beta(\lambda) \cdot \frac{(1-n)}{(1+n)^3} \right] (N_d - N_s) \cdot (1 - \text{sinc}(a, \lambda) \cdot \cos(2 \cdot k(\lambda) \cdot n \cdot z))$$

$N_d = 10^{20}$   
 $z = 300$   
 $a = 150$

1001

1002

Given

$$S(N_d, 9800, z, a) = 5.019 \cdot 10^{-3}$$

$$S(N_d, 8300, z, a) = 4.404 \cdot 10^{-3}$$

$$S(N_d, 7300, z, a) = 3.836 \cdot 10^{-3}$$

1004

1003

$$\text{Find}(N_d, z, a) = \begin{pmatrix} 8.028 \times 10^{19} \\ 3.99 \times 10^2 \\ 1.027 \times 10^2 \end{pmatrix}$$

1005

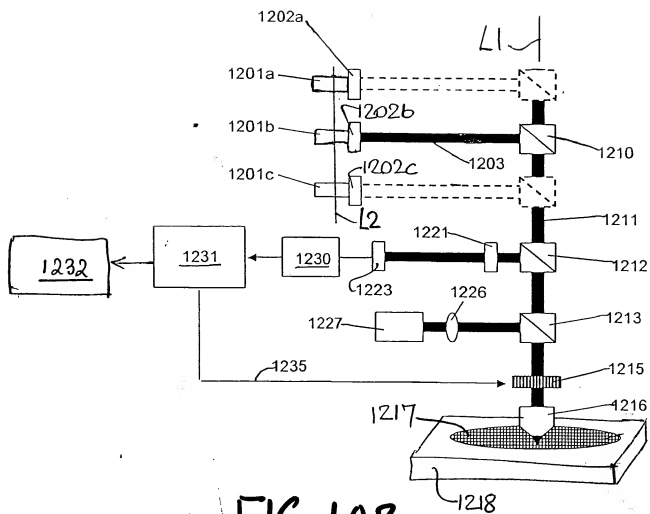


FIG. 10B

FIG. 10C

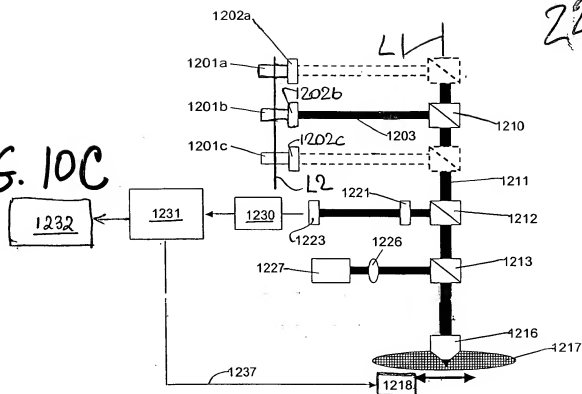


FIG. 11A

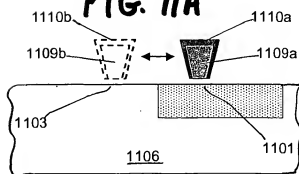


FIG. 11B

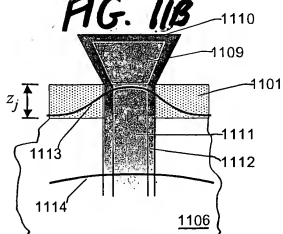


FIG. 11C

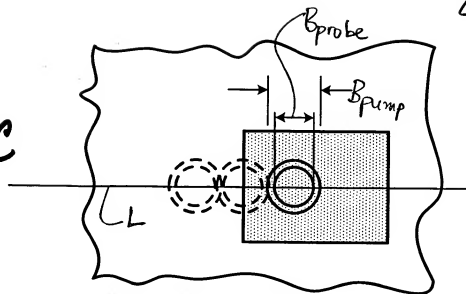


FIG. 12

